

WHAT IS GEOSCIENCE?

Geoscience is the study of the Earth and the complex geologic, marine, atmospheric, and hydrologic processes that sustain life and the economy. Understanding the Earth's surface and subsurface, its resources, history, and hazards allows us to develop solutions to critical economic, environmental, health, and safety challenges.



Satellite image: NASA/USGS Landsat Program. State outline (not to scale): Matt Battison.

By the numbers: VERMONT

- 941 geoscience employees (excludes self-employed)¹
- 37 million gallons/day: total groundwater withdrawal³
- \$149 million: value of nonfuel mineral production in 2017⁴
- 43 total disaster declarations, including 21 severe storm, 15 flood, and 2 drought disasters (1953-2017)⁶
- \$959,000: NSF GEO grants awarded in 2017¹⁴

WORKFORCE IN VERMONT

- 941 geoscience employees (excludes self-employed) in 2017¹
- \$64,141: average median geoscience employee salary¹
- 7 academic geoscience departments²

WATER USE IN VERMONT

- 37 million gallons/day: total groundwater withdrawal³
- 50 million gallons/day: total surface water withdrawal³
- 43 million gallons/day: public supply water withdrawal³
- 3 million gallons/day: water withdrawal for irrigation³
- 11 million gallons/day: industrial fresh water withdrawal³
- 61% of the population is served by public water supplies³

ENERGY AND MINERALS IN VERMONT

- \$149 million: value of nonfuel mineral production in 2017⁴
- Stone (crushed), sand and gravel (construction), stone (dimension): top three nonfuel minerals in order of value produced in 2017⁴
- 1.21 million megawatt hours: hydroelectricity produced in 2017⁵
- 279,000 megawatt hours: wind produced in 2017⁵
- 129,000 megawatt hours: solar produced in 2017⁵

NATURAL HAZARDS IN VERMONT

- 43 total disaster declarations, including 21 severe storm, 15 flood, and 2 drought disasters (1953-2017)⁶
- \$26 million: individual assistance grants (2005-2017)⁶
- \$52 million: mitigation grants (2005-2017)⁶
- \$109 million: preparedness grants (2005-2017)⁶
- \$273 million: public assistance grants (2005-2017)⁶
- 14 weather and/or climate events, each with costs exceeding \$1 billion (inflation adjusted) (1980-2017)⁷

1 U.S. Bureau of Labor Statistics, Occupational Employment Statistics, May 2017
2 American Geosciences Institute, Directory of Geoscience Departments, 53rd Edition (2018)
3 U.S. Geological Survey, Estimated Use of Water in the United States in 2015

4 U.S. Geological Survey, Mineral Commodity Summaries 2018
5 U.S. Energy Information Administration
6 FEMA Data Visualization: Summary of Disaster Declarations and Grants (accessed May 2, 2018)
7 NOAA National Centers for Environmental Information, U.S. Billion-Dollar Weather and Climate Disasters from 1980 to 2018 (accessed April 6, 2018)

AGI is a network of 52 member societies, representing more than 260,000 geoscientists.

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U.S. GEOLOGICAL SURVEY (USGS)

- \$1.15 billion: total USGS budget in FY 2018 (5.8% increase from FY 2017)⁸
- The National Cooperative Geologic Mapping Program funds geologic mapping projects with federal (FEDMAP), state (STATEMAP), and university (EDMAP) partners
- \$1.54 million: STATEMAP funding to the Vermont Geological Survey (1993-2016)⁹
- Middlebury College and University of Vermont have participated in EDMAP⁹
- USGS streamgages collect real-time or recent streamflow, groundwater, and water-quality data throughout Vermont

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

- \$20.7 billion: total NASA budget in FY 2018 (5.5% increase from FY 2017)¹⁰
- \$1.9 billion: total NASA Earth Science budget in FY 2018 (0% change from FY 2017)¹⁰
- Gravity Recovery and Climate Experiment (GRACE) satellites measure groundwater changes in Vermont
- Soil Moisture Active Passive (SMAP) satellite measures soil moisture in Vermont

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

- \$5.9 billion: total NOAA budget in FY 2018 (4.1% increase from FY 2017)¹¹
- Next-generation geostationary (GOES) and polar orbiting (JPSS) satellites provide weather forecasting over Vermont
- Deep Space Climate Observatory (DISCOVER) satellite monitors radiation and air quality over Vermont
- 6 National Weather Service Automated Surface Observing Systems (ASOS) stations in Vermont¹²
- 55 National Weather Service Cooperative Observer Program (COOP) sites in Vermont¹²

⁸ U.S. Department of the Interior, *FY 2019 Budget in Brief*

⁹ U.S. Geological Survey, *National Cooperative Geologic Mapping Program*

¹⁰ National Aeronautics and Space Administration, *FY 2019 Budget Estimates*

¹¹ National Oceanic and Atmospheric Administration, *FY 2019 Bluebook*

¹² NOAA *In Your State and Territory*

NATIONAL SCIENCE FOUNDATION (NSF)

- \$7.8 billion: total NSF budget in FY 2018 (4% increase from FY 2017)¹³
- \$1.4 billion: total NSF Geosciences Directorate (GEO) awards in FY 2017 (7.2% increase from FY 2016)¹⁴
- 7 NSF GEO awards in Vermont totaling \$959,000 in 2017¹⁴
- \$807,000: NSF GEO grants to University of Vermont & State Agriculture College in 2017¹⁴

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

- \$8.1 billion: total EPA budget in FY 2018 (0% change from FY 2017)¹⁵
- 12 active Superfund sites in Vermont in 2018¹⁶
- \$8.24 million: Drinking Water State Revolving Fund (DWSRF) grants in Vermont in 2017¹⁷
- \$200,000: Brownfield cleanup grants awarded to Vermont in 2018¹⁸

FEDERAL FACILITIES IN VERMONT

- USGS Water Resources Field Office, Montpelier
- NSF/UVM Community Cosmogenic Facility, Burlington

YOUR STATE SOURCE FOR GEOSCIENCE INFORMATION

Vermont Geological Survey

Main Building - 2nd Floor

1 National Life Drive

Montpelier, VT 05620-3902

<http://dec.vermont.gov/geological-survey>

802-522-5210

¹³ U.S. House of Representatives, *FY 2018 Omnibus Spending Bill (Division B) – Commerce, Justice, Science, and Related Agencies Appropriations Act, 2018*

¹⁴ National Science Foundation, *Budget Information System*

¹⁵ U.S. House of Representatives, *FY 2018 Omnibus Spending Bill (Division G) – Department of the Interior, Environment, and Related Agencies Appropriations Act, 2018*

¹⁶ U.S. Environmental Protection Agency, *Superfund Sites*

¹⁷ U.S. Environmental Protection Agency, *Drinking Water State Revolving Fund National Information Management System Reports*

¹⁸ U.S. Environmental Protection Agency, *Brownfields Grant Fact Sheet Search*

AGI's Geoscience Policy and Critical Issues programs support well-informed public policy and decision making by providing information and facilitating dialogue between the geoscience community and decision makers at all levels.

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